

# RF Transformer

50Ω 2400 to 2500 MHz 1:4 Ratio

## BLJC4-252R+



Generic photo used for illustration purposes only  
CASE STYLE: JC0603C

**+RoHS Compliant**

The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications



Available Tape and Reel at no extra cost

Reel Size	Devices/Reel
7"	20, 50, 100, 200, 500, 1000, 4000

### Maximum Ratings

Operating Temperature	-40°C to 85°C
Storage Temperature*	-40°C to 85°C
Input RF Power**	2W at 25°C

\*Refer to product storage temperature after installation. Suggestion for T&R unused product storage condition: +5-+35°C, Humidity 45-75%RH, 12 Month max. Permanent damage may occur if any of these limits are exceeded.

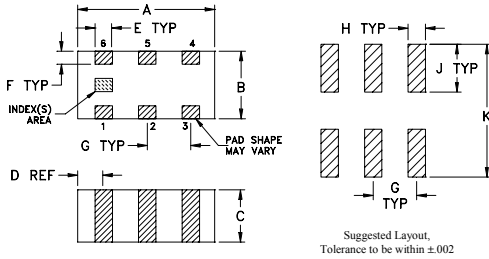
\*\*Derate linearly to 1W at 85°C.

### Pad Connections

PRIMARY DOT (Unbalanced Port)	1
GND or DC FEED	3
SECONDARY DOT (Balanced)	4
SECONDARY (Balanced)	6
NO CONNECTION	2,5

### Outline Drawing

PCB Land Pattern



### Outline Dimensions (inch/mm)

A	B	C	D	E	F
.063	.031	.024	.012	.008	.006
1.60	0.79	0.61	0.30	0.20	0.15
G	H	J	K	wt	
.020	.010	.022	.053	grams	
0.51	0.25	0.56	1.35	0.005	

### Features

- miniature size 0603 (0.063" [1.6mm] x 0.031" [0.8mm] x 0.024" [0.6mm])
- low phase unbalance, 0.8 deg. and amplitude unbalance, 0.2 dB typ.
- low cost
- aqueous washable

### Applications

- ISM Band
- WLAN
- Bluetooth
- Zigbee

### Electrical Specifications at 25°C

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
Impedance Ratio			4		
Frequency Range		2400	—	2500	MHz
Insertion Loss*	2400 - 2500	—	0.9	1.5	dB
Amplitude Unbalance	2400 - 2500	—	0.2	2	dB
Phase Unbalance†	2400 - 2500	—	0.8	10	Degree
Unbalance Return Loss	2400 - 2500	9.5	24	—	dB

\* Tested on Evaluation Board TB-1013+

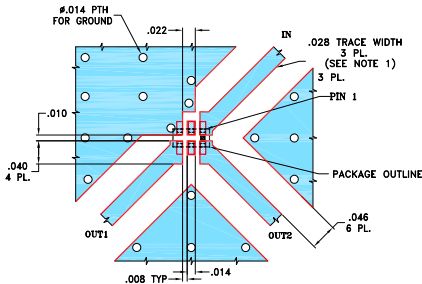
† Relative to 180°

### Typical Performance Data at 25°C\*\*

FREQUENCY (GHz)	INSERTION LOSS (dB)	INPUT R. LOSS (dB)	AMPLITUDE UNBALANCE (dB)	PHASE UNBALANCE (Deg.)
2.40	0.97	20.36	0.09	1.02
2.41	0.95	21.08	0.12	0.94
2.42	0.94	21.77	0.15	0.85
2.43	0.93	22.39	0.18	0.78
2.44	0.91	22.91	0.21	0.65
2.45	0.90	23.32	0.24	0.52
2.46	0.89	23.46	0.27	0.46
2.47	0.88	23.39	0.30	0.32
2.48	0.88	23.05	0.32	0.21
2.49	0.87	22.54	0.35	0.08
2.50	0.87	21.97	0.38	0.12

\*\* Measured with Agilent E5071B network analyzer using impedance conversion and port extension.

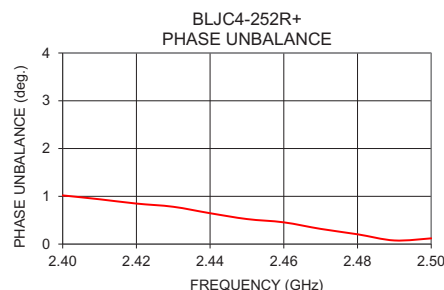
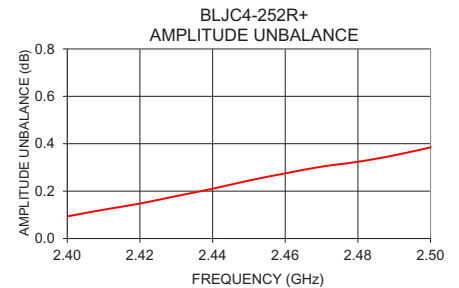
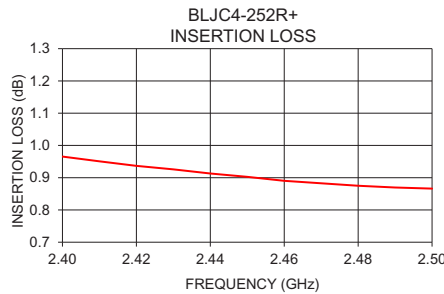
### Evaluation Board MCL P/N: TB-1013+ Suggested PCB Layout (PL-559)



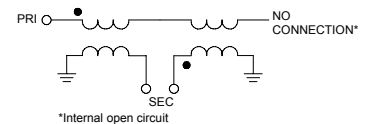
- NOTES:
1. TRACE WIDTH IS SHOWN FOR FR4, GRADE IT-180TC (TECO CORP.) WITH DIELECTRIC THICKNESS .016±.0015, COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH & GAP MAY NEED TO BE MODIFIED.
  2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.
- DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER).
- DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK.

### Notes

- A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
- B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at [www.minicircuits.com/MCLStore/terms.jsp](http://www.minicircuits.com/MCLStore/terms.jsp)



### Configuration J



*Typical Performance Data*

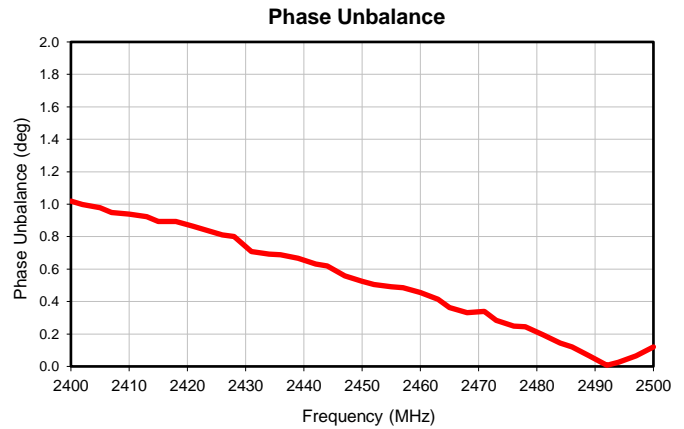
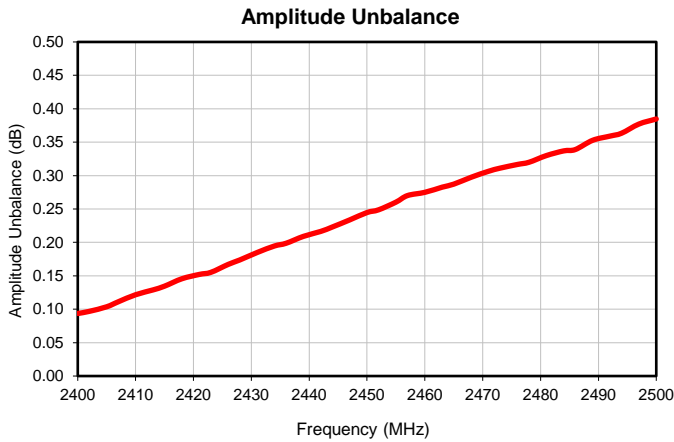
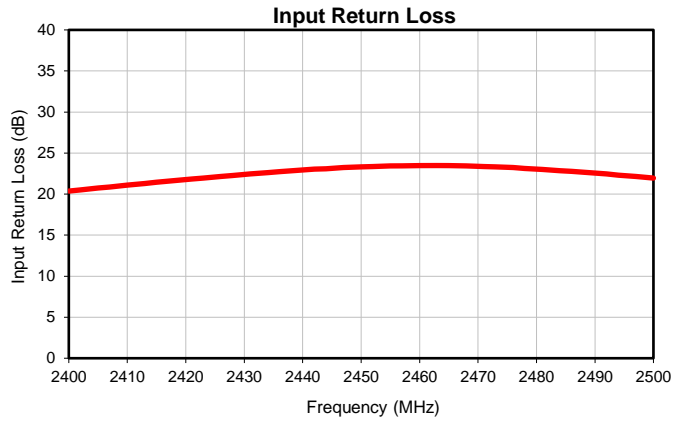
FREQUENCY (MHz)	AVERAGE INSERTION LOSS (dB)	INPUT RETURN LOSS (dB)	AMPLITUDE UNBALANCE (dB)	PHASE UNBALANCE <sup>(1)</sup> (deg.)
2400	0.97	20.36	0.09	1.02
2402	0.96	20.50	0.10	1.00
2405	0.96	20.74	0.10	0.98
2407	0.96	20.87	0.11	0.95
2410	0.95	21.08	0.12	0.94
2413	0.95	21.30	0.13	0.92
2415	0.94	21.44	0.13	0.89
2418	0.94	21.62	0.15	0.89
2421	0.94	21.84	0.15	0.86
2423	0.93	21.97	0.16	0.84
2426	0.93	22.15	0.17	0.81
2428	0.93	22.27	0.17	0.80
2431	0.92	22.46	0.18	0.71
2434	0.92	22.62	0.19	0.69
2436	0.92	22.72	0.20	0.69
2439	0.92	22.87	0.21	0.67
2442	0.91	23.03	0.22	0.63
2444	0.91	23.10	0.22	0.62
2447	0.90	23.22	0.23	0.56
2450	0.90	23.32	0.24	0.52
2452	0.90	23.35	0.25	0.50
2455	0.90	23.42	0.26	0.49
2457	0.89	23.44	0.27	0.49
2460	0.89	23.46	0.27	0.46
2463	0.89	23.48	0.28	0.41
2465	0.89	23.47	0.29	0.36
2468	0.88	23.42	0.30	0.33
2471	0.88	23.36	0.31	0.34
2473	0.88	23.30	0.31	0.28
2476	0.88	23.22	0.32	0.25
2478	0.88	23.13	0.32	0.25
2481	0.87	23.00	0.33	0.20
2484	0.87	22.87	0.34	0.14
2486	0.87	22.75	0.34	0.12
2489	0.87	22.61	0.35	0.06
2492	0.87	22.44	0.36	0.01
2494	0.87	22.31	0.36	0.03
2497	0.87	22.15	0.38	0.07
2500	0.87	21.97	0.38	0.12

<sup>(1)</sup> Relative to 180°

# LTCC Balun RF Transformer

## BLJC4-252R+

### Typical Performance Data



P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 • Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



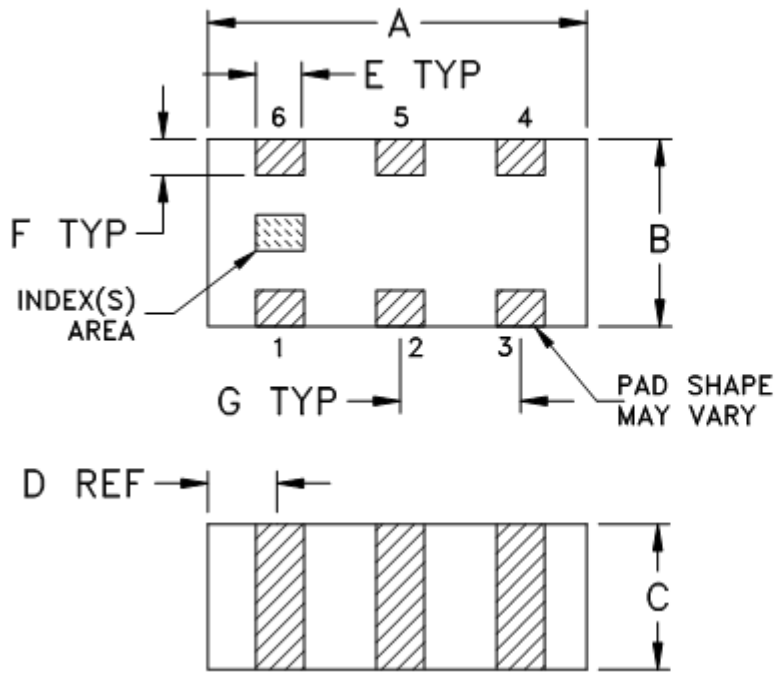
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IF/RF MICROWAVE COMPONENTS

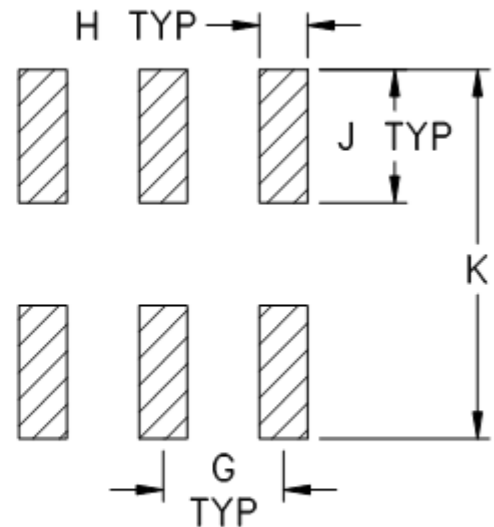
REV. OR  
BLJC4-252R+  
5/10/2019  
Page 1 of 1

## Outline Dimensions

JC0603C



## PCB Land Pattern



Suggested Layout,  
Tolerance to be within  $\pm .002$

CASE #	A	B	C	D	E	F	G	H	J	K	WT. GRAM
JC0603C	.063 (1.60)	.031 (0.80)	.024 (0.60)	.012 (0.30)	.008 (0.20)	.006 (0.15)	.020 (0.50)	.010 (0.25)	.022 (0.55)	0.053 (1.35)	.005

Dimensions are in inches (mm). Tolerances: 2 Pl.  $\pm .01$ ; 3 Pl.  $\pm .005$

### Notes:

1. Open style, ceramic base.
2. Termination finish:  
For RoHS Case Styles: Tin plate over Nickel plate. All models, (+) suffix.



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RF/IF MICROWAVE COMPONENTS

# Tape & Reel Packaging TR-F114

## DEVICE ORIENTATION IN T&R

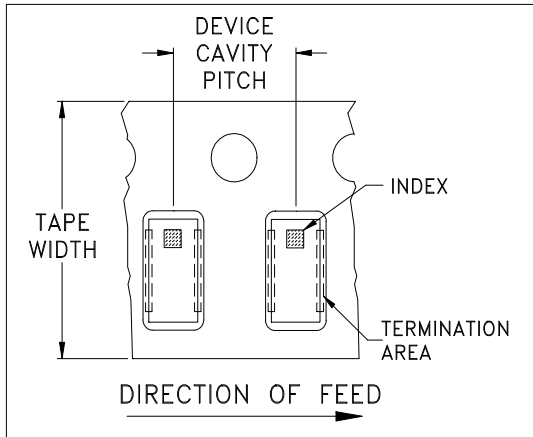


ILLUSTRATION 1

Applicable Case Styles	
GE0805C	JC0603C
GE0805C-1	JC0603C-4
GE0805C-1AP	JC0603C-6
GE0805C-7	
GE0805C-9	
GE0805C-10	
GE0805C-11	
GE0805C-12	

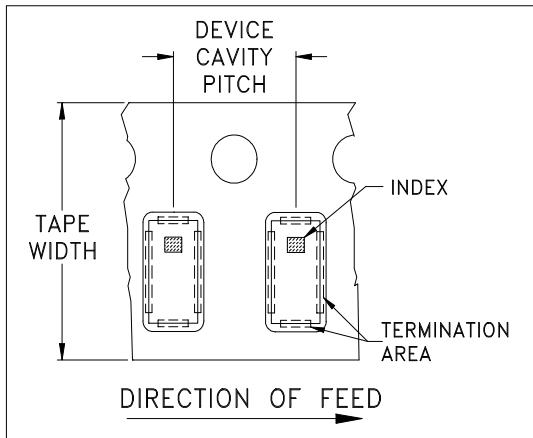


ILLUSTRATION 2

Applicable Case Styles	
GE0805C-2	JC0603C-1
GE0805C-3	JC0603C-2
GE0805C-4	JC0603C-3
GE0805C-5	JC0603C-5
GE0805C-6	JC0603C-7
GE0805C-8	JV1210C-1
GE0805C-15	

Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel	
8	4	7	Small quantity standards (see note)	20
				50
				100
				200
				500
				1000
			Standard	4000

Note: Please Consult individual model data sheet to determine device per reel availability.

Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

Go to: [www.minicircuits.com/pages/pdfs/tape.pdf](http://www.minicircuits.com/pages/pdfs/tape.pdf)



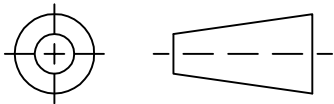
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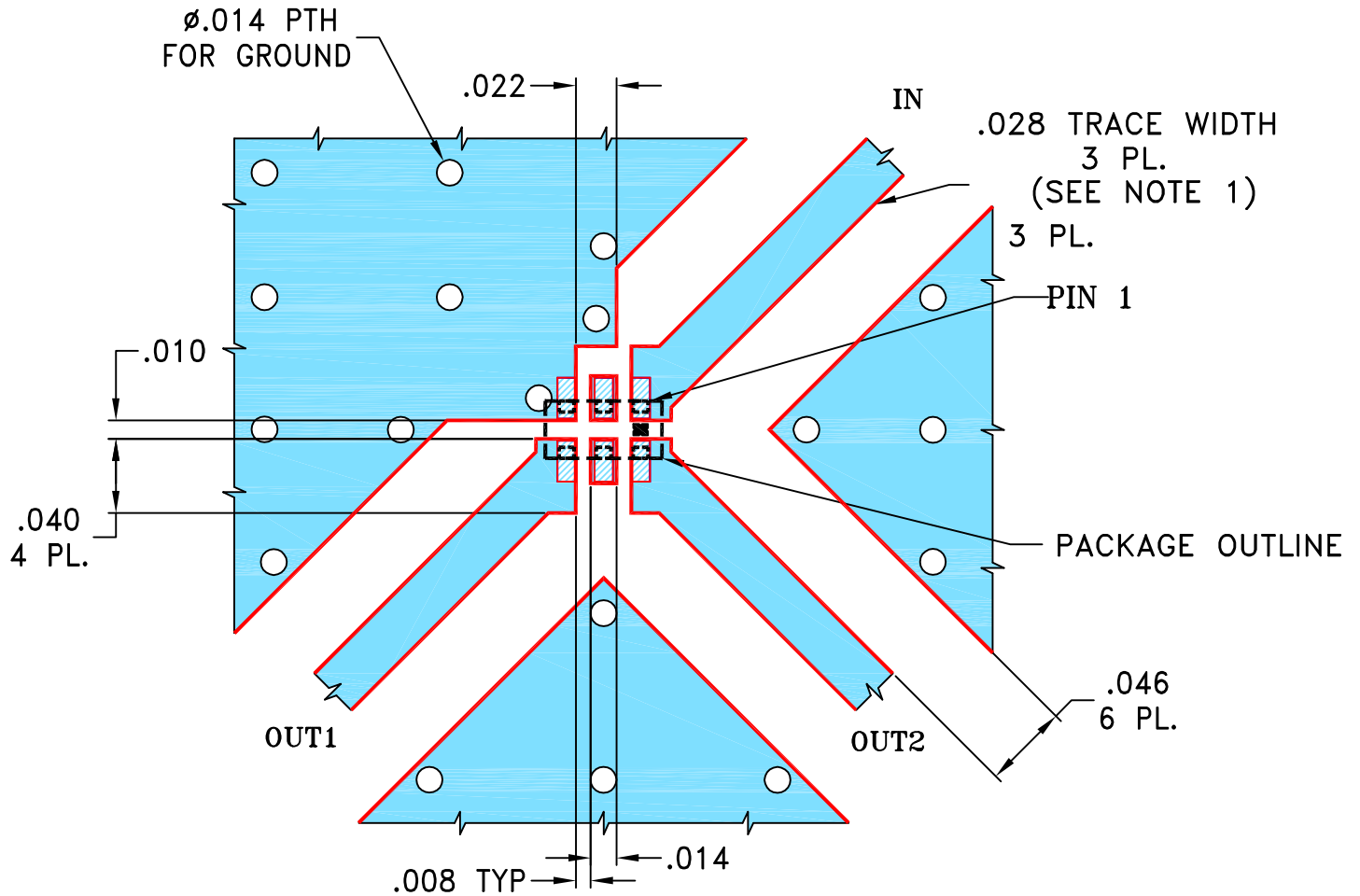
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M168200	NEW RELEASE	05/31/18	NP	SL

**SUGGESTED MOUNTING CONFIGURATION  
FOR JC0603C CASE STYLE, "06TJ06" PIN CODE**



**NOTES:**

1. TRACE WIDTH IS SHOWN FOR FR4, GRADE IT-180TC (ITEQ CORP.) WITH DIELECTRIC THICKNESS  $.016 \pm .0015$ . COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH & GAP MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

- DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER).
- DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK.

UNLESS OTHERWISE SPECIFIED	INITIALS	DATE
DRAWN	NP	05/30/18
CHECKED	GF	05/30/18
APPROVED	SL	05/31/18

DIMENSIONS ARE IN INCHES  
TOLERANCES ON:  
2 PL DECIMALS ±  
3 PL DECIMALS ± .005  
ANGLES ±  
FRACTIONS ±

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Brooklyn NY 11235

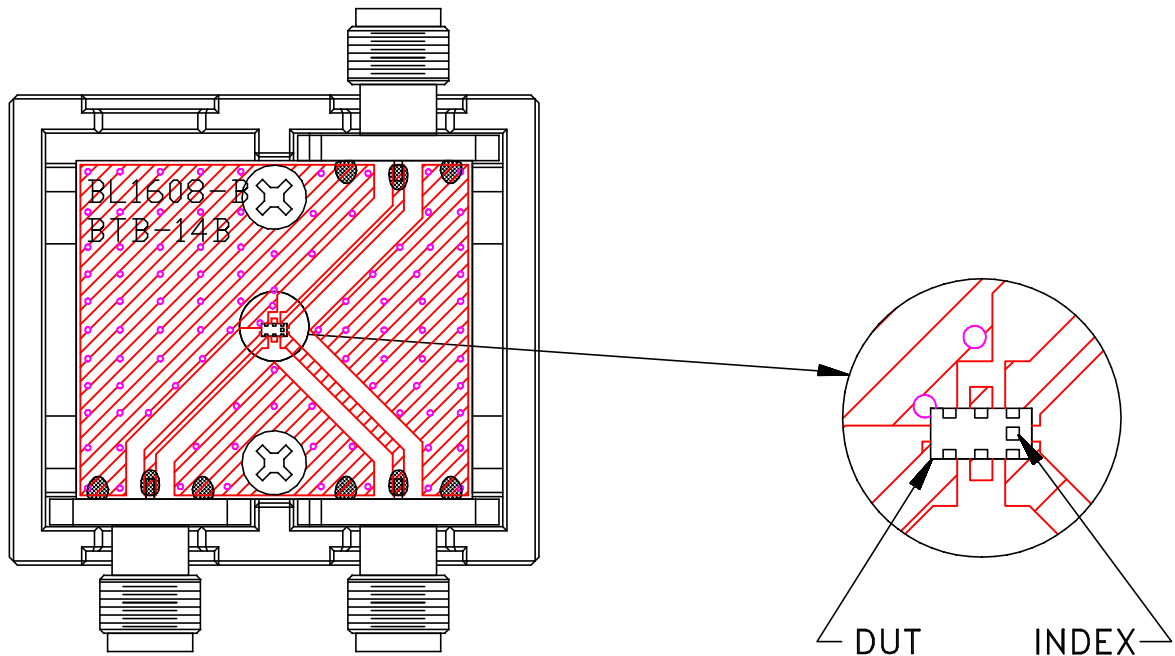
**PL, 06TJ06, JC0603C, TB-1013+**

SIZE A	CODE IDENT 15542	DRAWING NO: 98-PL-559	REV: OR
FILE: 98PL559	SCALE: 10:1	SHEET: 1 OF 1	

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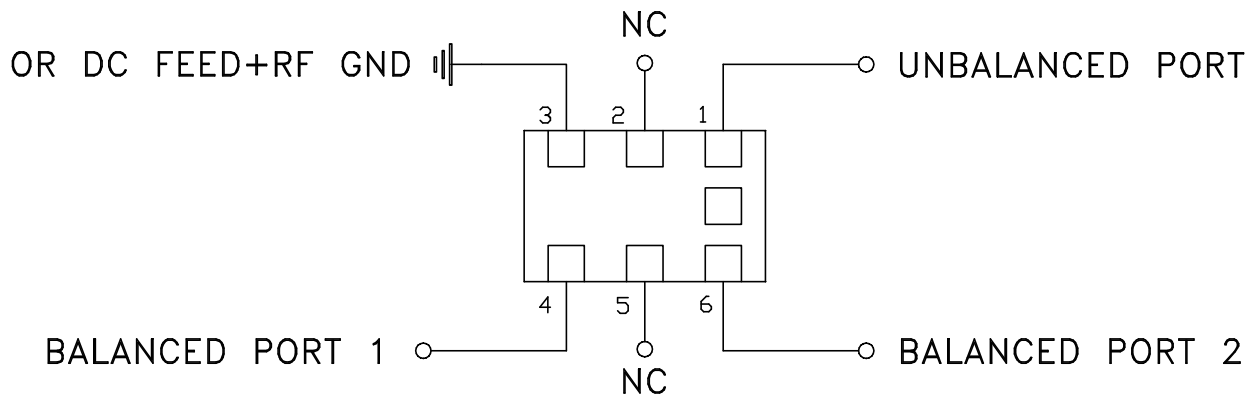
# Evaluation Board and Circuit

UNBALANCED PORT



BALANCED PORT 1      BALANCED PORT 2

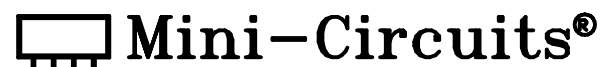
TB-1013+



Schematic Diagram

**Notes:**

1. 50 Ohm SMA Female connectors.
2. PCB Material: FR4 or equivalent,  
Dielectric Constant=4.5, Thickness=.016 inch.





All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-40° to 85° C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-40° to 85° C Ambient Environment	Individual Model Data Sheet
Humidity	90 to 95% RH, 240 hours, 50°C	MIL-STD-202, Method 103, Condition A, Except 50°C and end-point electrical test done within 12 hours
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
Solder Reflow Heat	Sn-Pb Eutectic Process: 225°C peak Pb-Free Process: 250°C peak	J-STD-020C, Table 4-1, 4-2 and 5-2; Figure 5-1
Solderability	10X Magnification	J-STD-002, Para 4.2.5, Test S, 95% Coverage
Vibration (High Frequency)	20g peak, 10-2000 Hz, 12 times in each of three perpendicular directions (total 36)	MIL-STD-202, Method 204, Condition D
Mechanical Shock	50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes	MIL-STD-202, Method 213, Condition A